UK energy

Britain's reliance on coal-fired power set to end after 140 years

Closure of final plant at the end of September marks a critical step in decarbonising electricity by 2030

Rachel Millard in Ratcliffe-on-Soar SEPTEMBER 4 2024

The 50-metre-high steel boiler walls in the Ratcliffe-on-Soar power station are accustomed to temperatures of 1,000 degrees centigrade as pulverised coal is pumped in from 36 burners.

“It’s a fireball in here when it’s running,” said plant manager Peter O’Grady, standing inside the 30-metre-long cavern of the plant in the East Midlands.

But today the walls are cold. The plant is past its heyday, running less of the time as it is squeezed out by gas-fired power stations, and wind and solar panels as the UK pushes to reduce its carbon dioxide emissions.

At the end of the month, Ratcliffe will close. It marks a key step in the government’s efforts to decarbonise electricity supplies by 2030, while also meeting growing electricity demand — part of its broader goal to cut emissions across the economy to net zero by 2050.

“It’s going to be a momentous occasion,” said John Roberts, a supervisor who joined the plant in Nottinghamshire aged 16. He is among the 170 colleagues employed by plant owner Uniper who will either stick around to help dismantle it, move on to other jobs or, like him, retire. “I’m 60. I’m ready,” he added.

Electrical engineer John Roberts joined the plant aged 16 © Fabio De Paola/FT

Home to the world's first coal-fired power station, opened in London in 1882, the UK is set to be the first G7 country to stop using coal to generate electricity, one year earlier than first set out by the previous Conservative government in 2015. Germany plans to do so by 2038, Canada by 2030 and Italy from the end of 2025, excluding the island of Sardinia.

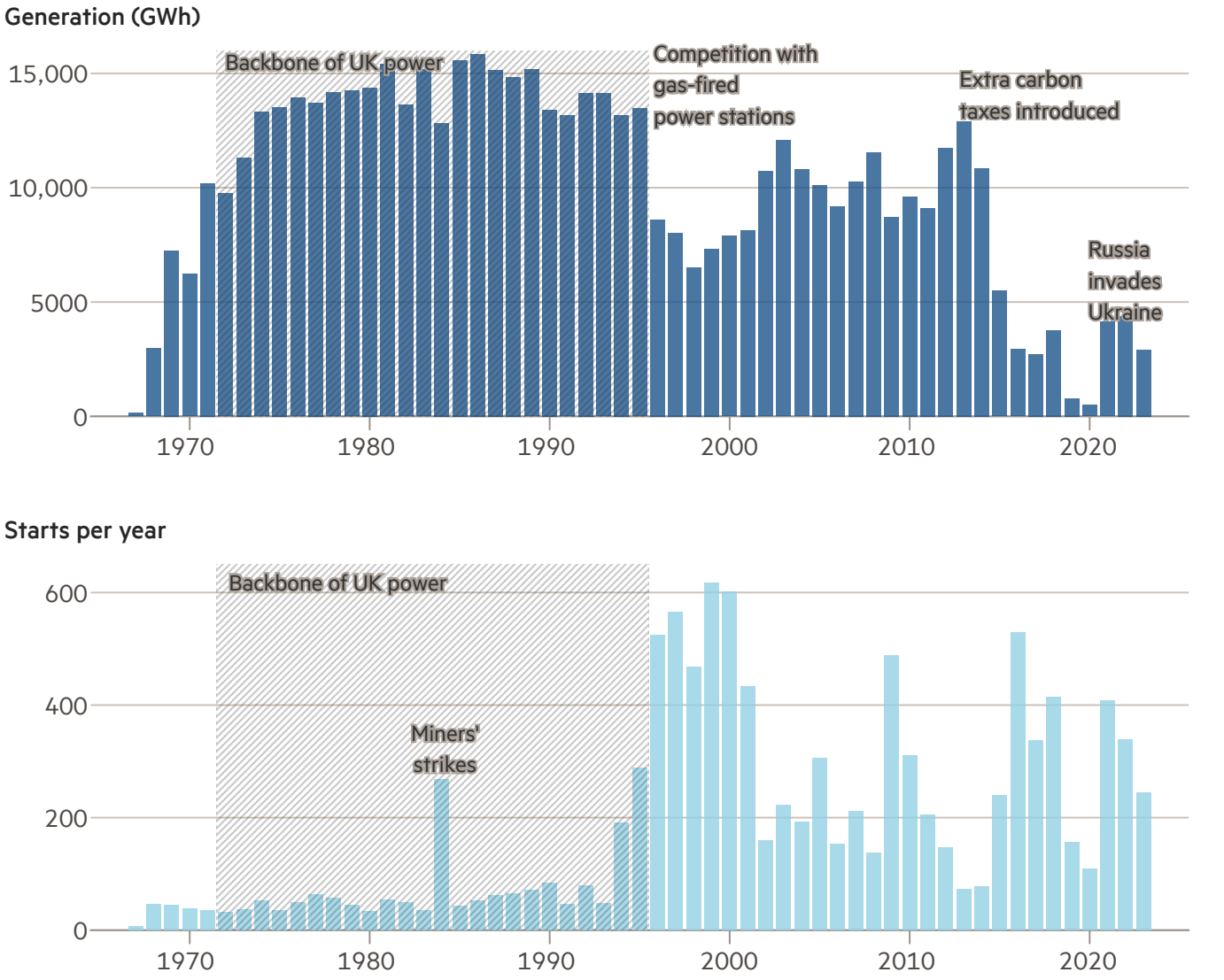
The date was brought forward in 2021 by then-prime minister Boris Johnson, as he sought to show the UK's climate leadership ahead of the UN annual climate change summit in Glasgow that year.

However, several plants that were due to close in autumn 2022 were asked by the government to stay online after Russia's full-scale invasion of Ukraine in February triggered fears about a gas crisis.

French-owned energy company EDF and other groups closed their last remaining coal-power stations in 2023, leaving Ratcliffe — built in the 1960s and able to power about 2mn homes — the last man standing.

Coal supplied 80 per cent of the UK's electricity in 1990 — but only 1 per cent last year, when 34.7 per cent came from gas, 32.8 per cent from wind and solar, 11.6 per cent from bioenergy, and 13.8 per cent from nuclear.

The changing role of Britain's last coal-fired power plant



FINANCIAL TIMES

Source: Uniper

The growth of renewable electricity has been enabled by government financial support and falling production costs, but also by technological developments to help the electricity system cope with fewer coal plants online.

Electricity supply and demand has to be matched second by second, an easier task when supply is coming mostly from large fossil fuel plants that can be turned up or down at will.

“As renewables become a large part of the energy mix, that’s where the physics of the system really changes,” said Matt Magill, acting director of markets at National Grid’s electricity system operator (ESO), which is responsible for balancing supplies to ensure there are no blackouts.

“As we use fewer big thermal machines, the system effectively becomes lighter. So when something happens [for example a generator tripping off], it reacts more quickly,” he said.

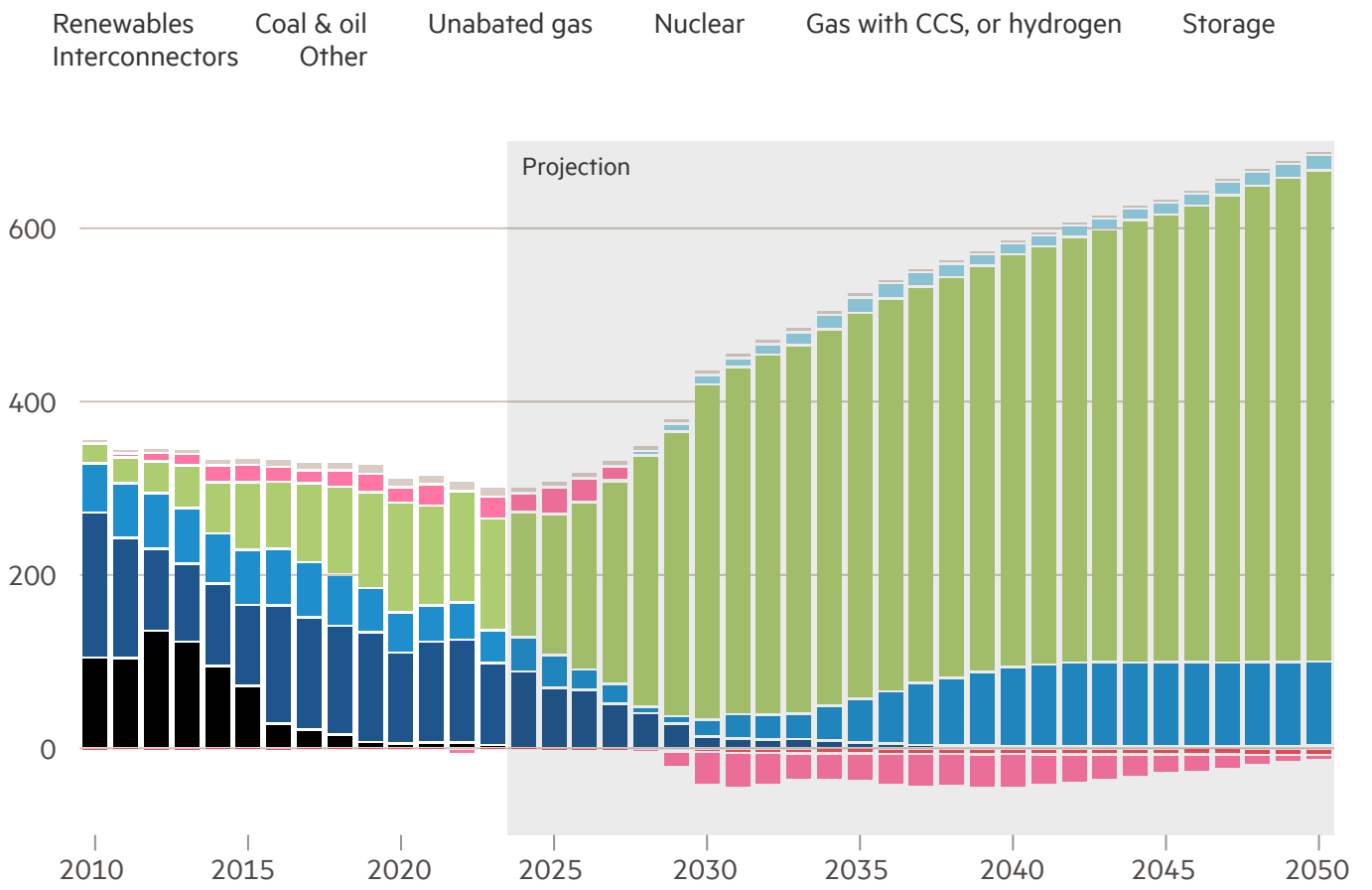
To fill the gap left by coal, he and his team have deployed a series of 200-tonne rotating “stabilisers” as well as giant lithium ion batteries, which can deploy power within seconds.

“A lot of people didn’t think it [the coal phaseout date] was possible,” added Magill. “It hasn’t happened by accident or magic. There’s been countless pieces of work to get us there.”

The next step towards the goal of net zero power by 2030 will require a far larger role for renewables and a lesser role for gas than exists currently.

Renewables are projected to make up 83% of Britain's electricity generation by 2050

Electricity generation, TWh



Source: LCP Delta • *CCS = carbon capture and storage

On Tuesday, the government took a step towards the former with 9.6 gigawatts of projects awarded government subsidy contracts in the latest annual auction round — 5.9GW higher than last year's round.

The ESO is also working on being able to run the system from next year for periods of time — at least 30 minutes or longer to start with — without gas-fired power plants online. Currently, gas plants have to run to stabilise the power system even when enough electricity is being generated without them. "It will be a big milestone," added Magill.

The move comes as the UK is set to become far more reliant on electricity as households and business are encouraged to switch to electric cars and heat pumps, with electricity demand expected to more than double by 2050.

LCP Delta, a consultancy, has warned there may be a "pinch point" in the early 2030s as gas-fired power stations' retirements outpace new wind and solar farm development.

The Turbine hall at Ratcliffe-on-Soar power station © Fabio De Paola/FT

The last remaining coal pile at the power station © Fabio De Paola/FT

“Can the UK simultaneously increase electricity demand, retire carbon emitting plants, and invest in wind and solar? It will certainly be challenging,” said Sam Hollister, head of economics, policy and investment at LCP Delta.

One big change on the horizon is getting households and businesses to be far more flexible about when they use electricity, for example by charging vehicles overnight instead of at teatime, in order to better match demand with intermittent sources of supply.

Technology and energy tariffs are being developed and expanded to automate and encourage greater flexibility, including by using electric car batteries to send electricity back to homes when needed.

“The biggest challenge we’ve done is sorting the physics,” said Magill, noting that the biggest one that lay ahead was solving how to enable the demand side of the system to support it.

Peter O'Grady: 'It's a fireball in here when it's running' © Fabio De Paola/FT

Simon Harrison, group head of strategy at Mott McDonald and a fellow at the Royal Academy of Engineering, said keeping the window open for "the new tech we don't know about yet is incredibly important".

"We are going on a journey where we don't know all the answers and nor should we," he added.

At Ratcliffe, there is little time to look back. "We're already in the planning for contracts for demolition," added O'Grady. "There's immense pride in the site to have been able to contribute to that one last hurrah."

Climate Capital

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